**SYLLABUS**

**BIOC 344-MOLECULAR BIOLOGY & GENETICS- SPRING 2016**

## I. Course-Level Learning Outcomes

Students taking this course will:

1. Develop an understanding of the fundamental principles of genetics.

2. Develop an understanding of the mechanisms by which genetic processes occur.

3. Develop an understanding of techniques by which those principles and mechanisms were elucidated.

4. Develop an understanding of the details of many of the fundamental experiments in the field, including the reasoning by which specific data led to specific conclusions.

5. Develop the critical and creative thinking skills that are the mark of a true scholar, by learning to analyze unfamiliar data and draw accurate conclusions.

6. Develop the ability to write clearly and accurately, when describing genetic principles and mechanisms, and when describing the analysis of a set of data.

## II. Tentative Lecture Schedule

Note: This schedule does not reflect changes that may be made by Dr. Novotny during the first two weeks.

| | Approx. # of Lectures |
|---|---|
| **A. Formal Analysis of the Transmission of Genes from Generation to Generation** | |
| 1. Mendelian Inheritance and the Role of Chromosomes | 2 |
| 2. Population Genetics | 2 |
| 3. Quantitative Inheritance | 1 |
| **B. The Nature of Genes** | |
| 1. Definition of Genes: Mutation, Open Reading Frames, Complementation, Activities of Gene Products | 1 1/2 |
| 2. Location of Genes: Recombination Mapping, Restriction Mapping | 2 |
| 3. Manipulation of Genes | |
| a. Natural Genetic Engineering | |
| (1) Lysogeny | 1 |
| (2) Transposition | 1 |
| b. Genetic Engineering by Human Intervention; Gene Therapy | 3 |
| **C. Molecular Mechanisms of Genetic Processes** | |
| 1. Regulation of Gene Action | 4 |

2. DNA Replication 2

D. Human Genetics

1. Human Genomics $1\ 1/2$
2. Genetic Disease $2\ 1/2$
3. Speculations on Genetic Engineering, Eugenics, and Human Evolution $1/2$

Over the course of the semester, time corresponding to about one lecture period will be occupied by administrative activities, review of exams and problems, etc. Also two lecture periods will be occupied by review sessions in preparation for exams.

## III. Relevant Sections in the Snustad & Simmons Text, 6th edition

(Numbers correspond to those in the Tentative Lecture Schedule.)

| | |
|---|---|
| A.1. | Mendelian Genetics, Chapters 2, 3, 5, 6 |
| A.2., A.3. | Population Genetics and Quantitative Inheritance, Chapters 22 and 23 |
| B.1. | Definition of Genes, Chapters 4, 12, and pages 337-346 |
| B.2. | Mapping, Chapter 7, 8, and pages 386-387 |
| B.3.a.(1) | Lysogeny, pages 166-169; 183-185 |
| B.3.a.(2) | Transposition, Chapter 17, especially pages 479-483 |
| B.3.(b) | Genetic Engineering, Chapters 14, 16, pages 572-575 |
| C.1. | Regulation of Gene Action, Chapters 11, 18, 19 |
| C.2. | Replication, Chapter 10 |
| D.1. | Human Genomics, pages 150-153; Chapters 15, 16 |
| D.2. | Genetic Disease, pages 439-455; Chapter 21 |

## IV. Disability

Any student with a documented disability needing academic adjustments or accommodations is encouraged to speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact Disabled Student Services in the Ley Student Center.

## V. Grading

Tentatively, graded work will include:

1. Three exams around the 5th and 10th and 15th weeks of the semester, 25% each. All exams will be 3 hours. The first two will be take-home exams. The third exam will be at the time scheduled for the final exam.
2. Two assigned problems around the 7th and 12th weeks of the semester, 10% each.
3. Two graded study questions, 2.5% each.

All exams and answers from 2014 and 2015 will be on reserve in the library, and you may study them as much as you wish. You may also look at any other course materials from those years, except for answers to the two graded study questions and the second Assigned Problem, as the identical problems will probably be used this year.
You may not look at any materials from this course for years prior to 2014.

Under the Honor Code, you are expected to obey all procedural instructions and restrictions that are announced for any particular exam or assignment, and to report any violations of the Honor Code by yourself or anyone else.

If you are sick at the time that an exam is scheduled, or have some other legitimate reason for not being able to take the exam as scheduled, you may take a makeup exam. Makeup exams will be the same as the original exams, so you must avoid hearing any discussion of the exam. Makeup exams must be taken within one week of the time the exam was originally due. If the makeup exam is taken later than that, you will also have to take an oral exam on the same material. If any individual takes more than one makeup exam during the semester, he or she must also take an oral exam in conjunction with the second makeup.

Regrades of any exam or problem must be requested within one week of the day that the graded work was returned.

**VI**. **The instructor is Charles Stewart.**
Office: Room W104, George R. Brown Building Phone: 713-348-4926
e-mail: crs@rice.edu I have no formal office hours, but you are welcome to come by at any time, or to make appointments for specific times.
**Substitute instructor for first 2 weeks is Alma Novotny.** Office: Room W131, George R. Brown Building. email: novotnya@rice.edu